

General Specifications

B Electrical Capacity (Resistive Load)

Power Level (silver): 6A @ 125V AC or 3A @ 250V AC or 3A @ 30V DC

Logic Level (gold): 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

Note: Find additional explanation of operating range in Supplement section.

Other Ratings

Contact Resistance: 10 milliohms maximum for silver; 20 milliohms maximum for gold

Insulation Resistance: 1,000 megohms minimum @ 500V DC

Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum;
1,500V AC minimum between contacts & case for 1 minute minimum

Mechanical Life: 50,000 operations minimum

Electrical Life: 25,000 operations minimum

Nominal Operating Force:		On-to-On Position	Off-to-On Position
Paddles	Single Pole	3.19N	3.92N
	Double Pole	4.41N	7.06N
Rockers	Single Pole	6.37N	9.80N
	Double Pole	13.73N	17.65N

Angle of Throw: 20°

Materials & Finishes

Housing: Stainless steel

Mounting Bracket: Stainless steel

Movable Contacts: Silver alloy or silver alloy with gold plating

Stationary Contacts: Silver with silver plating or copper or brass with gold plating

Lamp Contacts: Phosphor bronze

Base: Diallyl phthalate (UL94V-0)

Switch Terminals: Copper with silver or gold plating

Lamp Terminals: Brass with silver or gold plating

Environmental Data

Operating Temp Range: -10°C through +55°C (+14°F through +131°F) for rockers
-25°C through +70°C (-13°F through +158°F) for paddles

Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)

Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours

Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

Soldering Time & Temp: Wave Soldering (PC version): See Profile B in Supplement section.

Manual Soldering: See Profile B in Supplement section.

Note: Lever must be in center position while soldering.

Cleaning: PC mountable device is not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

Flammability Standards: UL94V-0 base

UL: File No. E44145 - Recognized only when ordered with marking on switch.

Add "/U" before dash in part number to order UL recognized switch.

Single pole rockers with synchronous circuits & single color LEDs & solder lug or PC recognized at 6A @ 125V AC.

CSA: File No. 023535_0_000 - Certified only when ordered with marking on switch.

Add "/C" before dash in part number to order CSA certified switch.

All single pole rockers with synchronous circuits & single color LEDs certified at 6A @ 125V AC.

TYPICAL SWITCH ORDERING EXAMPLE

M21

1

2

N

CF

W

01

Poles	
1	SPDT
* 2	DPDT
* Available only with Rockers with Terminals 01, 02, 03	

Circuits			
2	ON	NONE	ON
3	ON	OFF	ON

LED Colors	
Single Color	
C	Red
E	Yellow
F	Green
Bicolor	
CF	Red/Green

Contact Materials & Ratings	
W	Silver; Rated 6A @ 125V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max

LED Circuits & Actuator Types	
Rocker	
R	Isolated
N	Synchronous
Paddle	
P	Isolated
J	Synchronous

Terminals & Mounting Types	
01	Solder Lug with Flat Frame
02	Quick Connect with Flat Frame
03	Straight PC with Flat Frame
13	Straight PC with Bracket Mount
01	Solder Lug with Snap-in Frame
02	Quick Connect with Snap-in Frame
03	Straight PC with Snap-in Frame
13	Straight PC with Bracket Mount

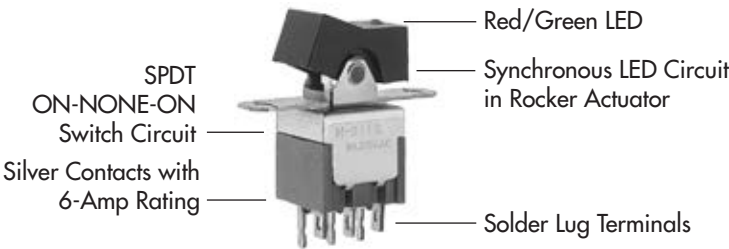
Optional Bezel & Colors	
For Snap-in Frame	
A	Black
B	White
E	Yellow
F	Green
G	Blue
H	Gray

IMPORTANT:




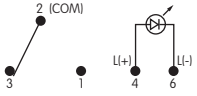
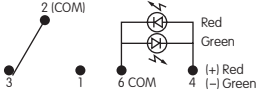
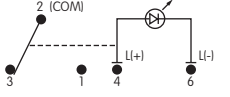
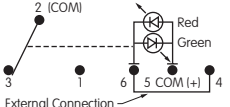
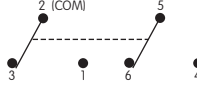
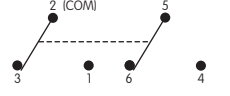
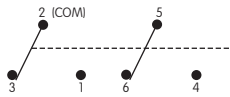
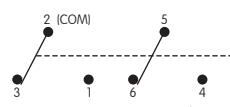
Switches are supplied without UL & CSA marking unless specified.
UL & CSA recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M21 12NCFW01



POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Toggle Position & Terminal Numbers			Schematics
		Down 	Center 	Up 	
M2112 Connected Power Terminals	SPDT	ON 2-3	NONE NONE	ON 2-1	<p>Notes: Terminal numbers are not actually on the switch. LEDs require an external power source.</p> <p>Isolated Single Color LED</p>  <p>Isolated Bicolor LED</p>  <p>Synchronous Single Color LED</p>  <p>Synchronous Bicolor LED</p> 
M2113 Connected Power Terminals	SPDT	ON 2-3	OFF OPEN	ON 2-1	
M2122 Connected Power Terminals	DPDT	ON 2-3 5-6	NONE NONE	ON 2-1 5-4	
M2123 Connected Power Terminals	DPDT	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	<p>Isolated Single Color LED</p>  <p>Isolated Bicolor LED</p>  <p>Synchronous Single Color LED</p>  <p>Synchronous Bicolor LED</p> 
M2112 Connected Power Terminals	SPDT	ON 2-3	OFF OPEN	ON 2-1	
M2113 Connected Power Terminals	SPDT	ON 2-3	OFF OPEN	ON 2-1	
M2122 Connected Power Terminals	DPDT	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	
M2123 Connected Power Terminals	DPDT	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	

LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section. The LED is an integral part of the switch and not available separately. Bicolor LED is translucent white when unlit.

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section. The LED is an integral part of the switch and not available separately. Bicolor LED is translucent white when unlit.		Rockers				Paddles				Units
		Single Color			Bicolor	Single Color			Bicolor	
		<div>C</div>	<div>E</div>	<div>F</div>	<div>CF</div>	<div>C</div>	<div>E</div>	<div>F</div>	<div>CF</div>	
		Red	Yellow	Green	Red/Green	Red	Yellow	Green	Red/Green	
Maximum Forward Current	I _{FM}	30	30	30	25	25	30	25	30/25	mA
Typical Forward Current	I _F	20	20	20	20	20	20	20	20/20	mA
Forward Voltage	V _F	2.2	2.1	2.2	1.7/2.0	2.25	2.1	2.2	2.0/2.2	V
Maximum Reverse Voltage	V _{RM}	4	4	4	—	5	5	5	—	V
Current Reduction Rate Above 25°C	ΔI _F	0.38	0.38	0.38	0.33/0.33	0.33	0.40	0.33	0.43/0.38	mA/°C
Ambient Temperature Range		-10° ~ +55°C				-25° ~ +50°C			-25° ~ +70°C	

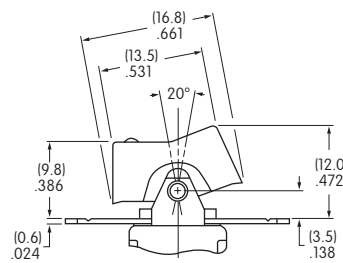
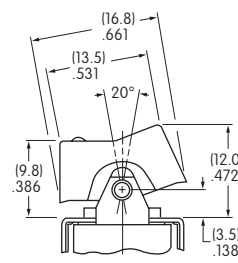
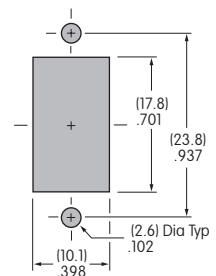
LED CIRCUIT, ROCKER, & MOUNTING TYPE COMBINATIONS

Rocker with
Isolated LED CircuitRocker with
Synchronous LED Circuit

Material: Polyamide

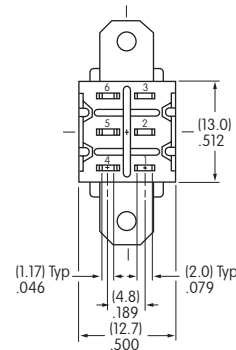
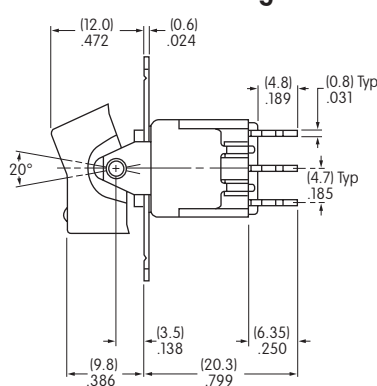
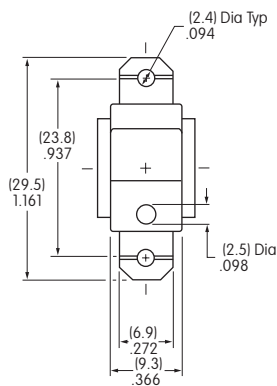
Finish: Matte

Color: Black

Flat Frame combines with
Terminal codes 01, 02, & 03.Bracket combines with
Terminal code 13.Maximum Panel Thickness
.126" (3.2mm)

TYPICAL ROCKER SWITCH DIMENSIONS

Single Pole



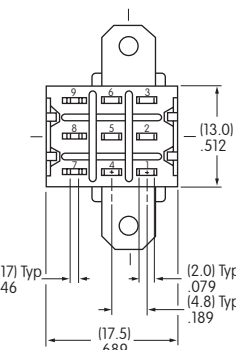
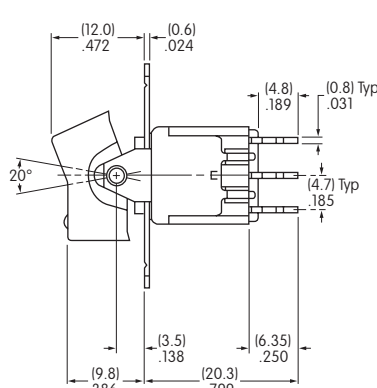
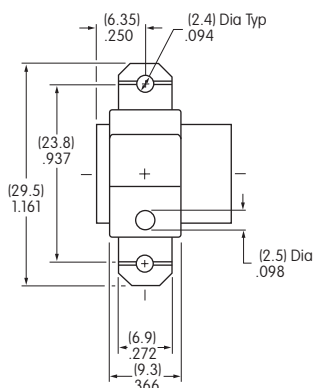
Single color LED switch does not have terminal 5.

Solder Lug



M2112NCFW01

Double Pole



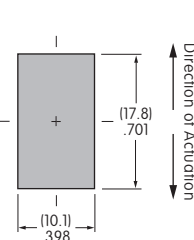
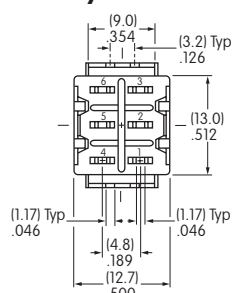
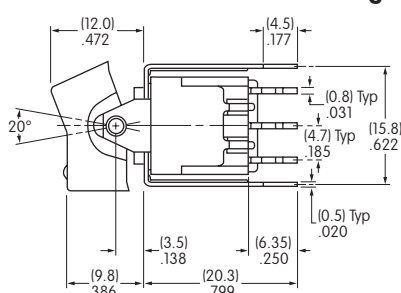
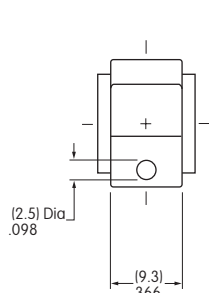
Single color LED switch does not have terminal 8.

Solder Lug



M2122NCFW01

Single Pole Only



Straight PC • Bracket



M2112NCFW13

Single color LED switch does not have terminal 5. Silver contact material is standard.

LED CIRCUIT, PADDLE, & MOUNTING TYPE COMBINATIONS

P

Paddle with Isolated LED Circuit

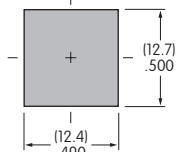
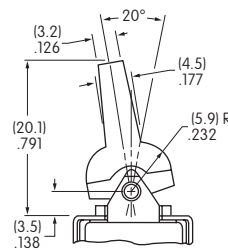
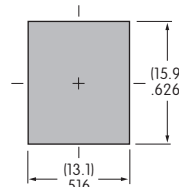
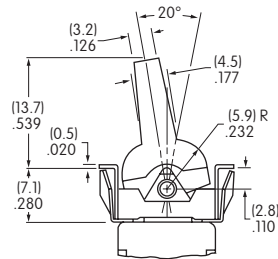
J

Paddle with Synchronous LED Circuit

Maximum Panel Thickness
.039" ~ .126" (1.0 ~ 3.2mm)
without Bezel
.039" ~ .098" (1.0 ~ 2.5mm)
with Bezel

Maximum Panel Thickness
.126" (3.2mm)

Material: Polyamide
Finish: Matte
Color: Black



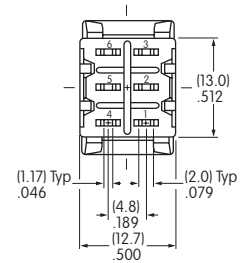
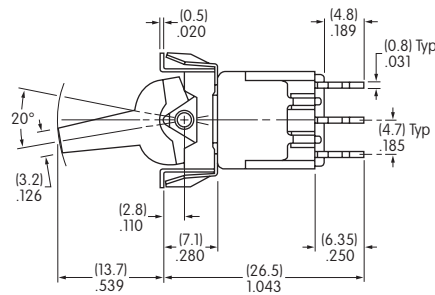
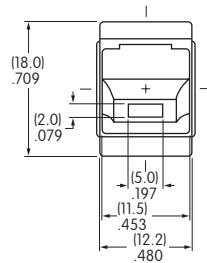
Snap-in combines with Terminal codes 01, 02, & 03

Bracket combines with Terminal code 13

TYPICAL PADDLE SWITCH DIMENSIONS

Solder Lug • Snap-in

Single Pole Only

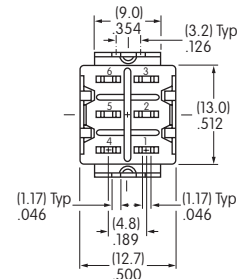
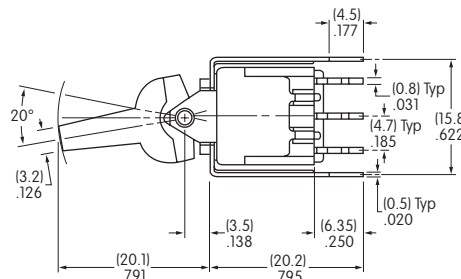
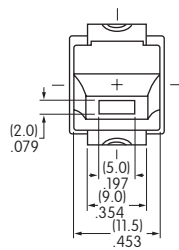


M2112JCFW01

Single color LED switch does not have terminal 5.

Straight PC • Bracket

Single Pole Only



M2112JCFW13

Silver contact material is standard. Single color LED switch does not have terminal 5.

CONTACT MATERIALS & RATINGS

W

Silver over Silver

Power Level

6A @ 125V AC & 3A @ 250V AC

G

Gold over Brass or Copper

Logic Level

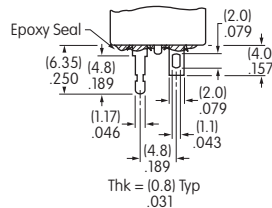
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

TERMINALS

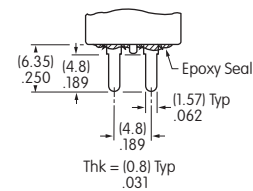
01

Solder Lug with Turret LED Terminal



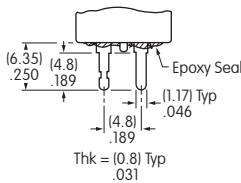
02

Quick Connect

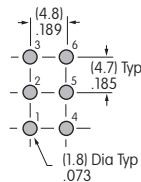


03

Straight PC with Turret LED Terminal

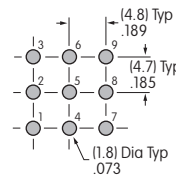


Single Pole



Single color LED & isolated bicolor LED switches do not have terminal 5.

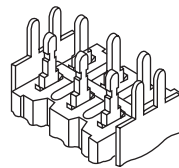
Double Pole



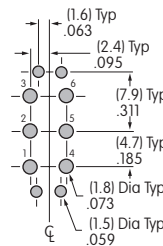
Single color LED & isolated bicolor LED switches do not have terminal 8.

13

Straight PC with Bracket & Turret LED Terminal



Single Pole



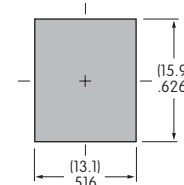
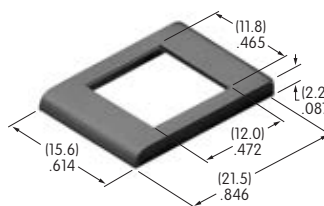
Single color LED & isolated bicolor LED switches do not have terminal 5.

OPTIONAL BEZEL & COLORS

AT2107 Bezel for Snap-in Panel Frame

Material: Polyamide

Finish: Matte



Colors Available:

A

Black

B

White

E

Yellow

F

Green

G

Blue

H

Gray